

AMENDED CLAIMS

What is claimed is:

- 5 1. (original) A sensing system comprising
 - (a) a signal generator that produces wide band transmit signals that have an equivalent representation in a frequency domain that is indicated by a frequency spectrum, and
 - (b) a transducer device that converts said wide band transmit signals to wide
 - 10 band wave signals that propagate in a medium as indicated by propagating wavefronts, where said medium is a combination of different materials, where said propagating wavefronts propagate in said medium where said different materials cause different signal attenuation that variably attenuates said wide band wave signals that are distributed over said wavefronts, and
 - 15 (c) attenuation leveling material having attenuation that matches attenuation of a subject of examination, and a device to arrange said attenuation leveling material such that said propagating wavefronts propagate through materials having approximately the same attenuation for any single frequency, to cause uniformity in amplitude of said wide band wave signals that are distributed over
 - 20 propagated wavefronts, for said any single frequency, and
 - (d) a receiving device that responds to said propagated wavefronts to produce wide band received signals, and
 - (d) a signal modification device that modifies said wide band transmit signals to produce pre-compensated signals that compensate for propagation effects such
 - 25 that said wide band received signals are uniform in amplitude over a frequency spectrum.
- 30 2. (original) A sensing system according to claim 1 and a vacuum device that improves contact between said conforming surface and said surface of said subject of examination.
- 35 3. (original) A sensing system according to claim 1 and a conforming surface to isolate coupling fluid from a surface of a subject of examination, and contact enhancing gel that improves transfer of ultrasonic wave signals between said conforming surface and said surface of said subject of examination.

4. (original) A sensing system according to claim 1 where said attenuation leveling material is an attenuating fluid.

5 5. (original) A sensing system according to claim 1 where said attenuation leveling material is an attenuating fluid that has low scattering properties.

6. (original) A sensing system according to claim 1 where said attenuation leveling material is an attenuating fluid that magnitude of scattering does not
10 add to an effect of scattering of a tissue type being examined.

7. (original) A sensing system according to claim 1 where said attenuation leveling material is evaporated milk.

15 8. (original) A sensing system according to claim 1 where said attenuation leveling material is a gel.

9. (original) A sensing system according to claim 1 where said fairing device is a flat Mylar sheet.
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10. (original) A sensing system according to claim 1 where said fairing device is a thin sheet of material stretched over a frame so that it is shaped by said frame.

11. (original) A sensing system according to claim 1 where said conforming
25 surface is a thin rubber sheet.

12. (original) A sensing system according to claim 1 where said system is used for breast imaging.

30 13. (original) A sensing system according to claim 1 where said transducer operates within attenuating fluid.

14. (original) A sensing system according to claim 1 where said transducer scans laterally without variation in operating power levels.

15. (original) An ultrasonic stand-off pad that couples signals between a transducer and a body to be examined, where said stand-off pad contains attenuating material, where said transducer produces wave signals that are wide band transmit signals, and said transducer receives wave signals to produce wide band received signals, and said wide band transmit signals are pre-compensated to cause said wide band received signals to be approximately uniform in amplitude over a wide frequency bandwidth.

16. (original) An ultrasonic stand-off pad according to claim 15 where said pad causes attenuation leveling.

17. (original) An ultrasonic stand-off pad according to claim 15 where attenuation of said pad enables operation of ultrasonic equipment without power reduction.

18. (original) An ultrasonic stand-off pad according to claim 15 where said pad contains milk.

19. (original) An ultrasonic stand-off pad according to claim 15 where said pad contains evaporated milk.

20. (original) An ultrasonic stand-off pad according to claim 15 where said pad is equipped with a port that enables filling with a syringe.

21. (original) An ultrasonic stand-off pad according to claim 15 where said pad is connected to a reservoir by a tube so that attenuating fluid can allow volume of said pad to vary.

22. (original) An ultrasonic stand-off pad according to claim 15 and a vacuum device to assure close contact with a body surface.

23. (original) An ultrasonic stand-off pad according to claim 15 and an ultrasonic transducer device that is operated at an angle not perpendicular to skin surface of a body to be examined.

24. (original) An ultrasonic stand-off pad according to claim 15 and an ultrasonic transducer device that is operated in relation to uneven body surfaces.

5 25. (original) An ultrasonic stand-off pad according to claim 15 and medical operations that produce images of tissue within a body that is being examined.

26. (original) An ultrasonic stand-off pad according to claim 15 and coupling gel that improves signal transfer.

10 27. (original) An ultrasonic stand-off pad according to claim 15 where said pad is a container made of thin rubber that is a conforming surface.

28. (original) An ultrasonic stand-off pad according to claim 15 and a device to inject a substance into a subject of examination.

15 29. (original) An ultrasonic stand-off pad according to claim 15 and apparatus to guide surgical instruments.

20 30. (original) An ultrasonic stand-off pad according to claim 15 and apparatus to guide injection instruments.

31. (original) An ultrasonic stand-off pad according to claim 15 where said pad is a firm gel.

25 32. (original) An ultrasonic stand-off pad according to claim 15 where said pad is an attenuating gel having sufficient viscosity that it remains between a transducer and skin of a subject.

30 33. (canceled)

34. (canceled)

35. (canceled)

36. (new) A sensing system for examining a subject, said sensing system comprising

(a) a transducer apparatus that operates in relation to wavefronts in a medium of propagation, where said medium includes material that is included in said subject, where said medium causes frequency dependent attenuation, and
(b) signal modification apparatus that compensates for said frequency dependent attenuation to produce compensated signals, where said compensated signals include frequency component signals that are distributed over a frequency spectrum, where compensation includes adjustments at component signal frequencies that offset attenuation effects at respective operating frequencies to control relative amplitude of respective said frequency component signals.

37. (new) A system according to claim 36 where said compensation for frequency dependent attenuation is compensation that is accomplished by modifying received signals.

38. (new) A system according to claim 36 where said compensation for frequency dependent attenuation is compensation that is accomplished by modifying transmit signals.

39. (new) A system according to claim 36 where said medium includes a coupling material that enables propagation between said transducer apparatus and said subject, where said coupling material is held between said transducer apparatus and said subject, and said coupling material is an attenuation leveling material that is selected such that attenuation effects at operating frequencies in said attenuation leveling material match attenuation effects at respective operating frequencies in said subject to enable control of signal amplitude for signals that are distributed over a wavefront.